ZAC-1023-2 / ZAC-1023-5

Part Number(s): ZN-7200-2EI-O / ZN-7200-2AEI-O

Quick Installation Guide

IEEE 802.11 b/g/n Wireless CPE

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Disclaimer

About the Quick Installation Guide

This Quick Installation Guide is intended to guide professionals in the installation and configuration of the ZAC-1023 series CPE. It covers procedures that will assist you in avoiding unforeseen problems.

Conventions

Warning:

This sign indicates a warning or caution.

Note:

This sign indicates an important note.

Chapter 1 Introduction

Zcomax's ZAC-1023 series of 2x2 MIMO CPE's support multiple operational modes in either the 2.4 GHz or 5 GHz frequency band. These models also come with Zcomax's Virtual Access Controller firmware, which offers a low cost zero-touch management solution. The ZAC series is suitable for small business and large enterprise wireless ISP applications where multiple network devices are required.

What truly sets this wireless LAN solution apart from the others is its versatility. When operating as an access point, the ZAC-1023 can provide centralized management and monitoring of all the managed Aps on the network without the additional expense of a separate WLAN controller. Additionally, The ZAC-1023 series can be configured as a point-to-point bridge, solving last mile communications needs. This product is truly an out of the box solution requiring minimal knowledge or skill to configure.

Hardware Appearance

Front View

Back View

Mounting Hole

Inside the Bottom Cover

Passive 24 Vdc POE

Reset button

Grounding point
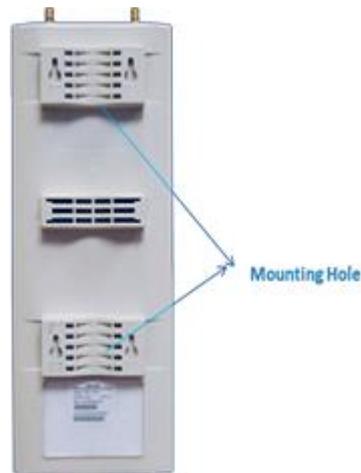
LED Indicators

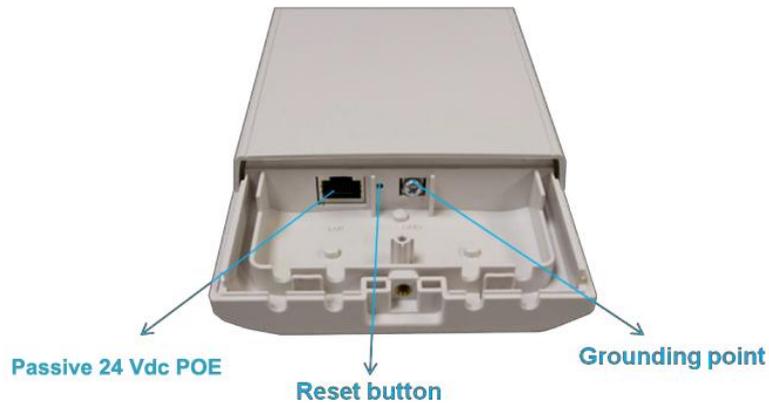| LED	COLOR	STATUS	DESCRIPTION
PWR	Green	On	The device is powered on
		Off	The device is not receiving power
LAN	Green	On	The device has Ethernet connection
		Off	The device has no Ethernet connection
		Blinking	Transmitting/receiving data
WLAN	Green	On	The WLAN is active
		Off	The WLAN is inactive
		Blinking	Transmitting/receiving wireless data
Signal*3	Green	3 LED On	Excellent signal strength
		2 LED On	Good signal strength
		1 LED On	Weak signal strength

Chapter 2 Installation Safety Precautions

Here are extremely important safety factors to consider. Learning and following simple safety precautions can quite literally save your life. Following safety procedures also helps prevent costly damage to your equipment and property.

No list of safety guidelines can cover every potential hazard. Consequently, careful planning, common sense, and good judgment must be used at all times.

1. Locate and avoid power lines and other wires in the work area.

2. Do not climb on a wet or icy roof. Do not attempt high installations on windy days.

3. Do not position ladders at angles steeper than 70˚.

4. Dig the base of the ladder into the ground if possible.

5. Do not climb on roofs that have curled or worn shingles. (Old shingles break easily or pull out.)

6. Wear clothing that is not too tight or too loose. Wear rubber soled shoes or boots.

7. Carefully survey the job before beginning the installation to locate secure handholds, dangerous conditions (such as power lines and weak roofs), and the safest and most convenient placements for ladders.

8. Do not climb onto a roof when there is no one else around. Be sure all of your helpers know and follow safe procedures.

9. Do not install antennas under large, over- hanging tree branches if it can be avoided.

10. Antennas must be installed away from power lines at a distance equal to at least twice the combined length of the mast and antenna. Thoroughly plan every installation. Carefully think through the job, and don't take dangerous shortcuts.

Installation Precautions

Zcomax recommends following these precautions while installing your ZAC-1023 series CPE.

1. Do not touch or move the antenna while the unit is transmitting or receiving.

2. Do not hold any transmitting antenna or radio-containing component close to any exposed parts of the body, especially the face or eyes.

3. Do not operate the radio or attempt to transmit data unless the antennas are connected; otherwise, the radio will be damaged.

4. Use a good known ground and power surge protector, all outdoor installations are subject to lightning and power transients.

• ESD (Lightning) DAMAGE IS NOT COVERED UNDER WARRANTY.

Installers MUST use the manufacturer's power supply & POE injector shipped with the ZAC-1023 series, or the radio will be damaged and warranty voided.

Product Package

The package you received should contain the following items. If any item is missing or damaged, please contact your vendor for support.

• IEEE 802.11n ZAC-1023 CPE	X1
• Detachable 5dBi antennas	X2
• Pole Mounting Ring	X2
• 24 VDC POE Injector	X1
• AC Power cord	X1
• Ferrite Suppression Core	X1
• Grounding Wire	X1
• Product CD	X1

Note:

Product CD contains the Quick Installation Guide and User Manual.

Pole Mounting Ring

Ferrite Suppression Core

24VDC Power Cord & POE Injector

⚠️ **Warning:**

Installers MUST use the manufacturer's power supply & POE injector shipped with the ZAC-1023 CPE, use of a non-factory approved power supply will destroy the device and void the warranty.

Chapter 3 Hardware Installation

1. The bottom of the ZAC-1023 CPE has a removable cover. Remove the retaining screw and slide the cover off as shown below.

2. Insert an Ethernet cable from the POE into the RJ45 port.

3. Slide the cover back to seal the bottom of the ZAC-1023.

Using the Grounding Wire

The ZAC-1023 series CPE is equipped with a grounding wire. It is important that both the CPE and POE Injector are properly connected to earth ground during normal use to protect against surges or ESD.

1. Remove the screw on the ground terminal point at the bottom of the ZAC 1023.

2. Put the grounding wire on the grounding terminal at the bottom of the ZAC 1023. Tighten the screw.

3. Connect the ground wire to a good known earth ground.

Installing External Antennas

The ZAC 1023 has two SMA-RP external antenna connectors.
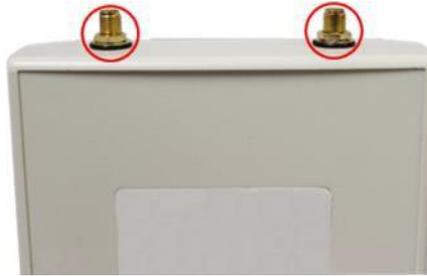
1. Connect the included external antennas to the SMA-RP connectors on top of the CPE.

⚠ Warning:

Installers MUST power off the ZAC 1023 before connecting the external antennas. Do not power on the device without the antennas attached. Doing so will damage the unit.

2. Tighten the antenna connectors by turning clockwise. Zcomax recommends fixing one antenna in a horizontal position and the other vertical. This will give 30 dBi of isolation between the radios.

Note:

> The polarization of antennas should be properly aligned. Maximum signal strength between bridges occurs when both bridges are using identical polarization.

DO NOT bend or turn the antennas without loosening the connector joint. Otherwise, damage may occur to the antennas and/or SMA terminals.

3   Antenna installation is complete.

Mount the CPE onto a Pole

1.   Unlock each pole mounting ring with a screwdriver. Slide each ring through the
      two mounting foot channels located on the back of the unit as shown.
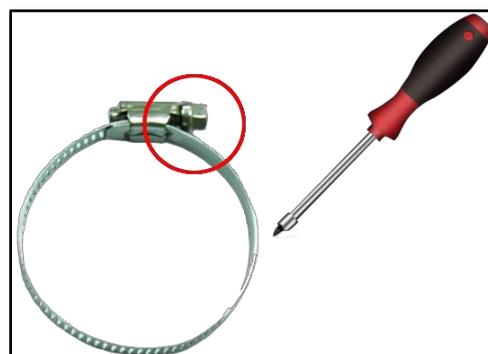
2.   Mount the ZAC 1023 to the antenna mast; tighten hose clamps firmly. Over-tightening the screws will damage the mounting foot.

Powering Up

Connect the power cord to the POE injector. Connect an Ethernet cable from the CPE to the "Data & Power Out" port of the Injector.

Connecting the ZAC-1023 to your Network

Follow these instructions for configuration and management:

1.   Open the ferrite core by unsnapping the connector latches. The core will open, revealing a concave surface.

2.   Lay the Ethernet cable into the core, usually within 2 to 3 inches of the connector. You may have to experiment with the final location depending on the effectiveness of the high frequency abatement.

3.   Loop the cable around and through the core. This may be required in circumstances with severe interference.

4.   Close the core and snap the assembly back together.

5.   Insert the Ethernet cable into the "Data In" port of the POE injector.

6.   Connect the Ethernet cable to a PC, switch or hub.

7. Plug the power cord into an A/C power outlet. The unit will immediately boot. You can begin the device configuration described below.

Power Socket

Switch hub or PC

Note:

The Ethernet port on the ZAC-1023 series is auto configured. There is no need for cross-over cabling.

Chapter 4 Configuration

1. Connect the ZAC-1023 CPE to your PC with an Ethernet cable, plugged into the LAN port of the POE injector.

2. Assign a static IP address to your PC's TCP/IP IPv4 Properties. It should be in the same subnet as the ZAC-1023. The default IP address is 192.168.1.1, so you may choose from 192.168.1.2 ~ 192.168.1.254. Use a Class-C subnet mask. No default gateway configuration is needed.
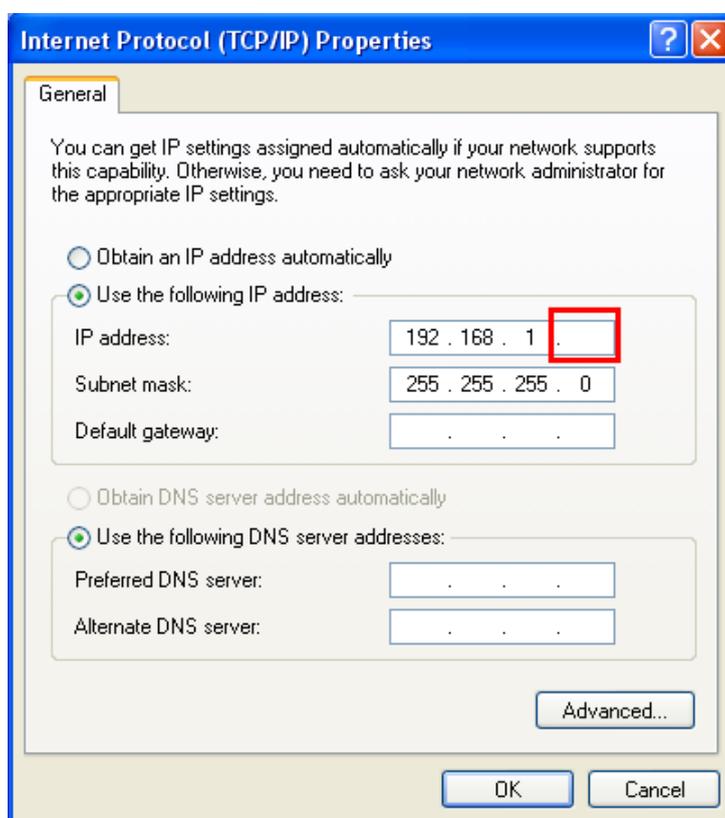
3. Open the web browser on your PC, type in the default IP address (192.168.1.1) of the ZAC-1023 CPE in the address bar, and then hit Enter.

4. Enter the default username and password on the log-in web page of the ZAC 1023 Access Point. The defaults are "**admin**" and "**password**." Click **Login.**

Configuring ZAC-1023 Operation Mode

The ZAC-1023 CPE is a versatile wireless networking device supporting multiple operational modes. This quick installation guide covers; "Thin AP mode", "AC+Thin AP mode", and "FAT AP mode". For further information covering operational modes not discussed here, refer to the user's manual.

Virtual Access Point Controller Mode

To operate as AC + Thin AP, go to **Basic Settings**. From the **Device Mode** drop-down list, select "**Virtual AC**" mode. If you would like the Access Point to perform as a virtual controller and access point concurrently, select "**Virtual AC + Thin AP**" mode. Then assign an IP address to the ZAC-1023 CPE and specify subnet mask, gateway, and DNS addresses respectively. Click **Apply.** It will take approximately 50 seconds for the change to take effect.

✎ **Note:**

AC + Thin AP mode allows the ZAC 1023 CPE to operate as access controller and thin AP concurrently.

For Virtual Controller + Thin AP mode, you will need to configure the SSID and encryption method settings for the ZAC-1023 CPE. Go to **Wireless Settings > Wireless Networks** and click on #1 **Wireless** SSID for configuration. After the configuration is made, click **Save**.

The ZAC-1023 will allow you to configure up to 8 virtual networks and encryption levels.

A dialog message will pop up to confirm the changes. Select **Apply** to save the values to all the managed Thin APs.
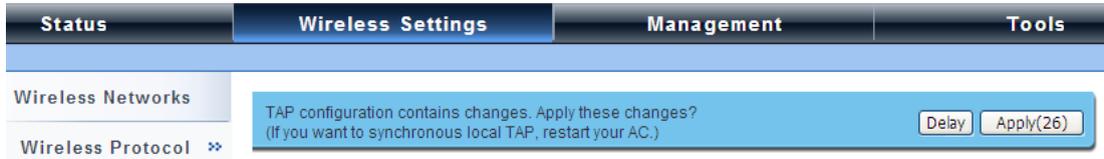
To make profile settings on the ZAC-1023 VAP controller take effect, you will need to reboot. Go to **Management > Configuration File** and click the **Reboot** button. The process will take approximately 50 seconds to complete.
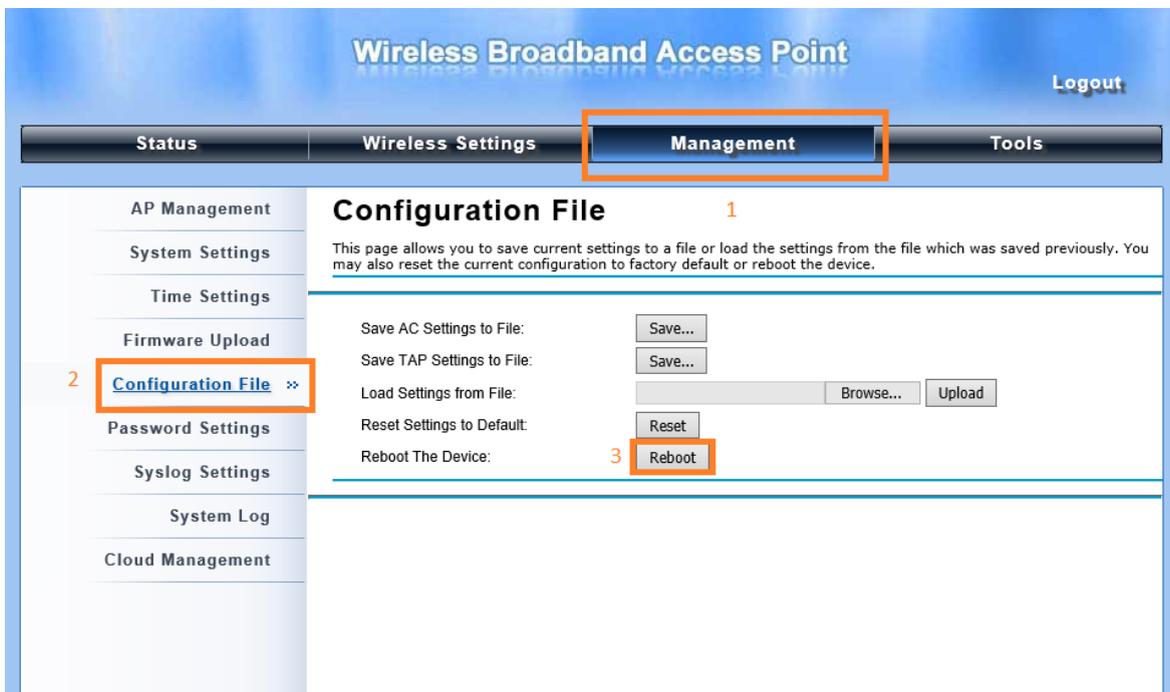
Firmware Upgrade for ZAC-1023 in AC Mode

To upgrade the firmware for the ZAC-1023 in AC mode, go to **Management > Firmware Upload** and select **Upgrade AC Firmware**, then browse to the location of the firmware file on your computer. Hit **Upload** to start the upgrade process. It will take approximately 2 minutes to complete.
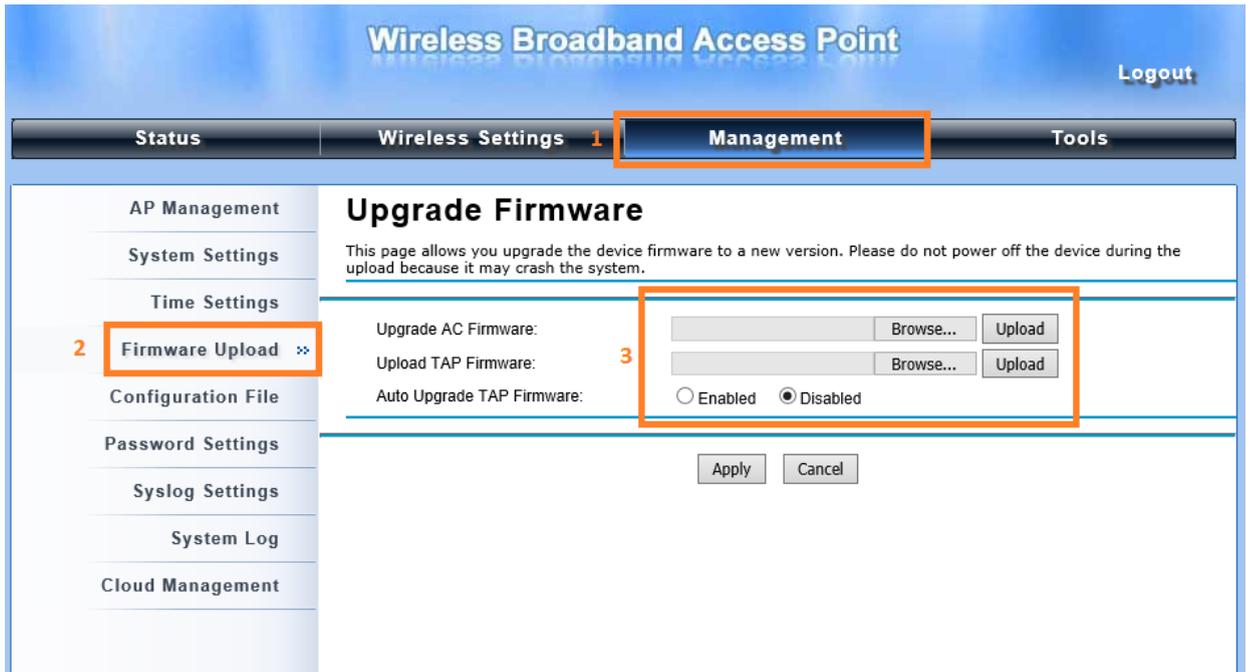
Install the Managed Thin AP

Install and connect the rest of the managed ZAC-1023 CPEs in your network via Ethernet cables. When powered on, they will automatically discover the ZAC-1023 controller and register themselves to the network.

To verify if the thin APs have been successfully registered, enter the web page of the ZAC 1023 Access Point master access controller and go to **Management > AP Management**. You will see "**Registered**" in the **Status** column. Besides registration status, other information is available; such as the device name, MAC address, IP address, FW version, the number of clients that associate to each thin AP, and upload/download speed.

Moving the mouse over the MAC address of each managed AP will display relevant RF information such as channel mode, current channel, the type of antenna being used, and transmit output power.

Configure and Manage Thin APs:

Enter the web page of the ZAC Access Point in AC mode and go to **Management > AP Management**.

The configured AP in Virtual AC + Thin AP mode is highlighted in bold on the list. By selecting it and hitting the **Radio** button, you can configure the **channel bandwidth**, **channel antenna,** and **output power**.
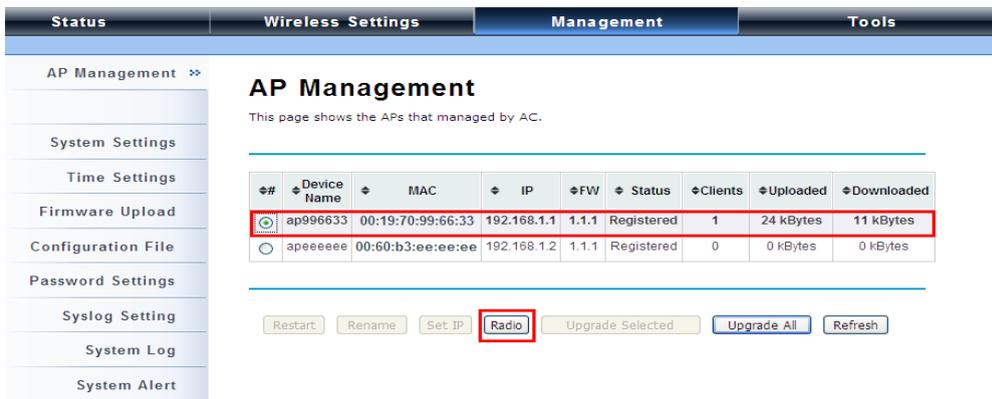
AP Management also allows you to reboot the managed AP, change its IP address, and perform firmware upgrades.
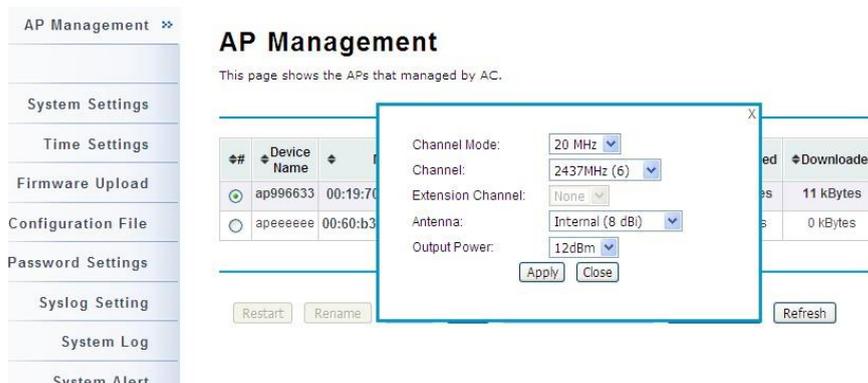
Firmware Upgrade for Managed Thin APs

For firmware upgrades, you may choose to upgrade the selected Thin AP by clicking **Upgrade Selected** or the entire group by clicking **Upgrade All**. First you need to locate the new firmware for the ZAC-1023 CPE. Go to **Management > Firmware Upload**, browse the firmware file location on your PC, click **Upload** and **OK**.

When this window appears, you have successfully updated your firmware.

You can now go back to **Management > AP Management** for a single or group update.
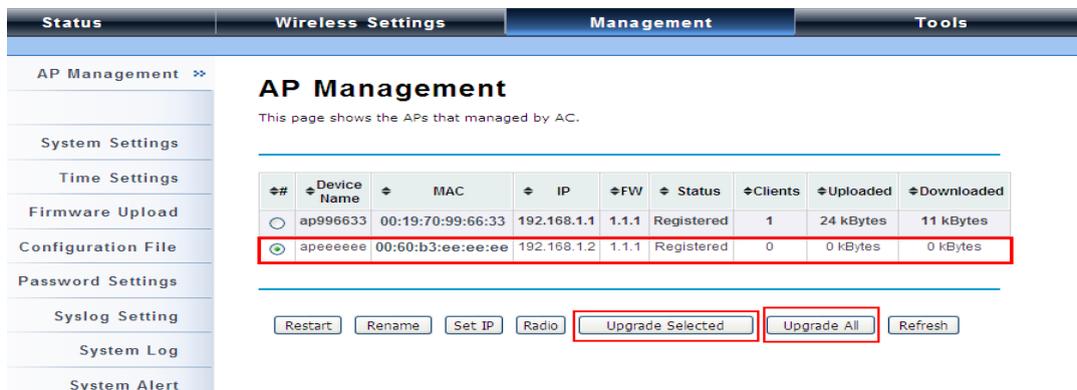
Monitor Managed Thin APs

To view each managed CPE's status, go to **Status > Managed Aps.** Here you can view device information: CPE Name, MAC address, IP address, and Firmware version. You can also monitor the wireless CPEs that are currently associated with the managed VAP along with transmission and packets statistics.

Status	Wireless Settings	Management	Tools

Information
Managed APs »
Wireless Users
DHCP Clients

Managed APs

This page shows the APs that managed by AC.

Device Name	MAC	IP	FW	Status	Clients	Uploaded	Downloaded
ap996633	00:19:70:99:66:33	192.168.1.1	1.1.1	Registered	1	3 kBytes	0 kBytes
apeeeeee	00:60:b3:ee:ee:ee	192.168.1.2	1.1.1	Registered	0	0 kBytes	0 kBytes

Refresh

Configuring Fat AP mode

The Fat AP mode is used for to configure ZAC-1023 series CPE as;

1. A single access point, wireless gateway.

2. A Wireless Client / Station.

3. A P2P (Point 2 Point) bridge.

4. A P2MP (Point 2 Multi Point)

Login using the instructions provided earlier. Select the **Basic Settings** tab, and then for the **"Device Mode"** choose **Fat AP**.
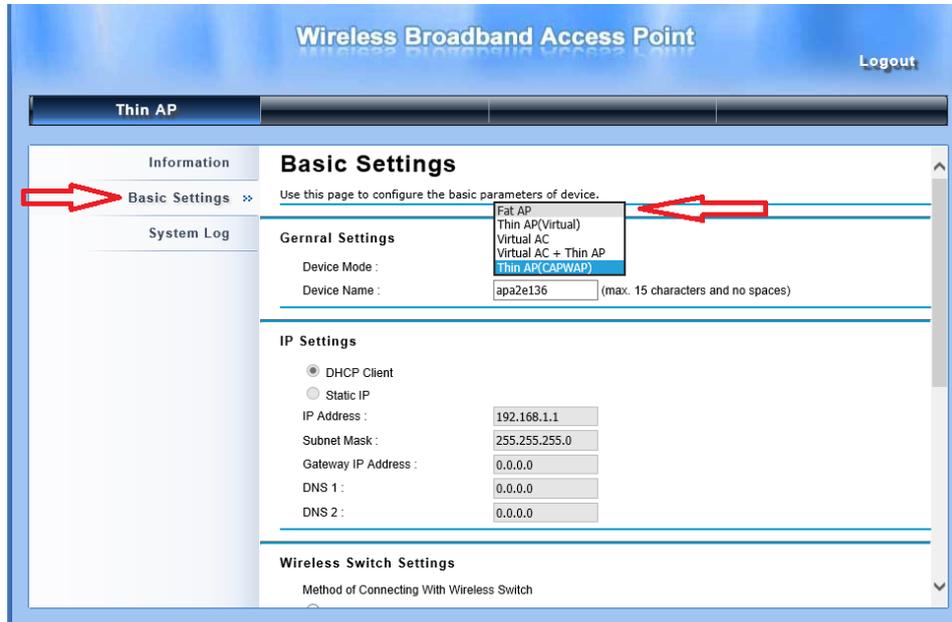
A confirmation window will appear. Click "**OK**" and the CPE will reboot.
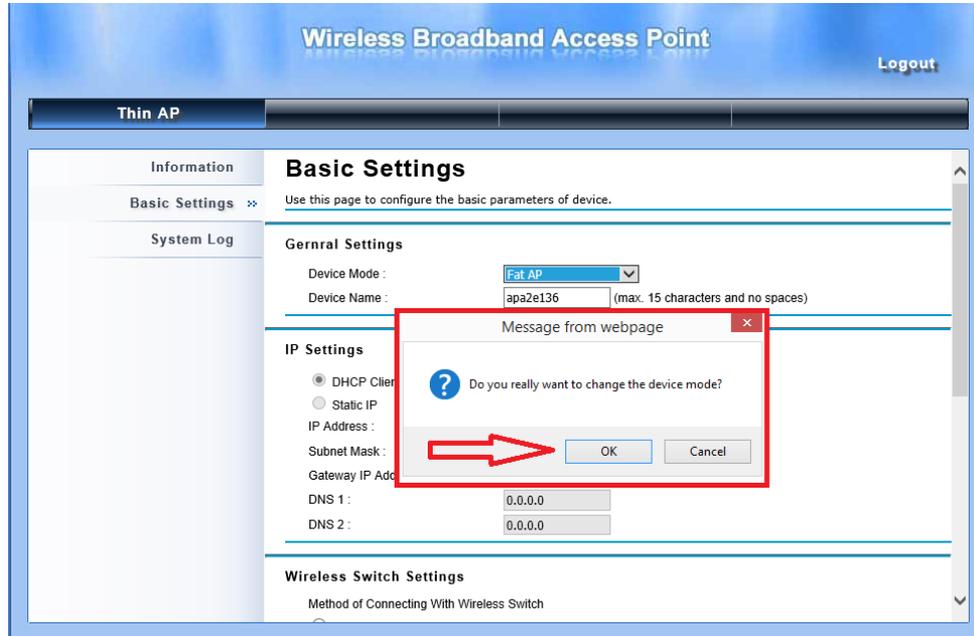
If your CPE was previously configured in virtual access mode, it can be switched to **Fat AP** mode. Go to **Management > System Settings**. From the **Device Mode** drop-down list, select "**Fat AP**" and click **YES** to make the change take effect.
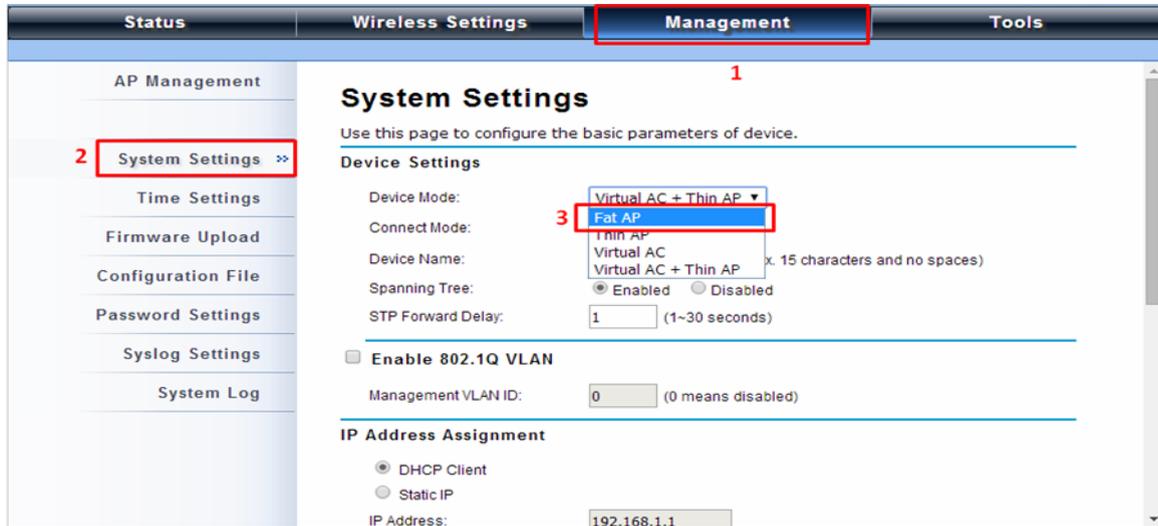
The CPE will write your selection to the firmware, which takes 60 seconds. After the changes are made, the device will reboot.

Device settings have been reset to factory defaults.
Please wait for **56** seconds before attempting to access the device again...

The Fat AP covers these modes; "**AP**", "**Wireless Client**", "**Bridge**", and "**AP Repeater.**"

Setting Networking Parameter

From the Status Page, select **SYSTEM**, then the **Network Settings** tab. This will open the network settings for the Ethernet port on the CPE.

AP Mode

1. Choose **Wireless > Basic Settings**. The default mode is AP. Here, you can change wireless parameters such as SSID, operating channel, transmit output power, etc. After the configuration is made, click **Apply** to save.
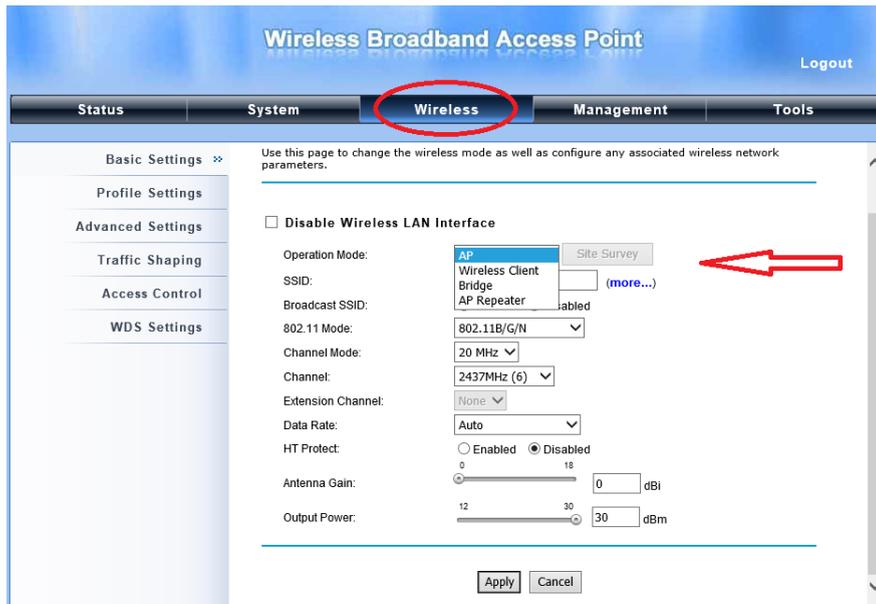
Note:

To keep the CPE within the legal transmit power regulations for your country, please enter known gain value of the antenna(s). The firmware will compensate for that value and adjust the power levels on the ZAC-1023 CPE.
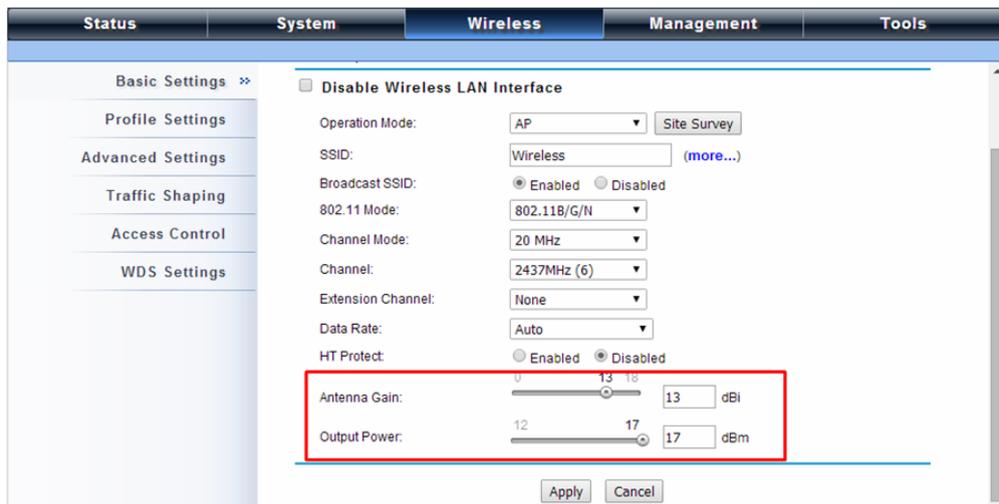
1. If security is required, open **Wireless > Profile Settings** and click on "**Profile 1**" as shown below.

2. You may configure parameters such as "Network Authentication" and "Data Encryption" for more secure network communication. After the configuration is made, click **Apply** to save.

To improve data transmission at long distances, the ZAC-1023 CPE can automatically adjust proper ACK timeout values by specifying the distance between the nodes. To set the distance, go to **Wireless > Advanced Settings** and enter the value in the **Distance** field. If the distance is less than 1000 meters, leave the field unchange

Wireless Client Mode

1. Go to **Wireless > Basic Settings** and choose "**Wireless Client**" from Wireless Mode. Specify the SSID for the Access Point. Then enter the gain of the external antennas. Click **Apply** to save the configuration.
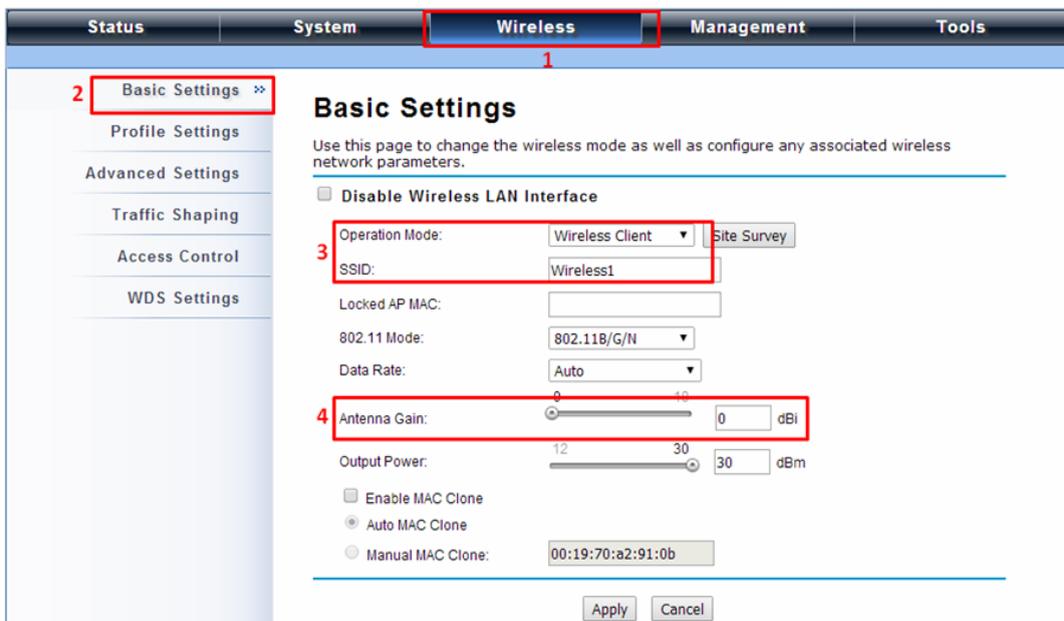
2. Besides specifying the SSID manually, you may select a preferred Access Point to connect to by clicking the "**Site Survey**" button beside **Wireless Mode**.
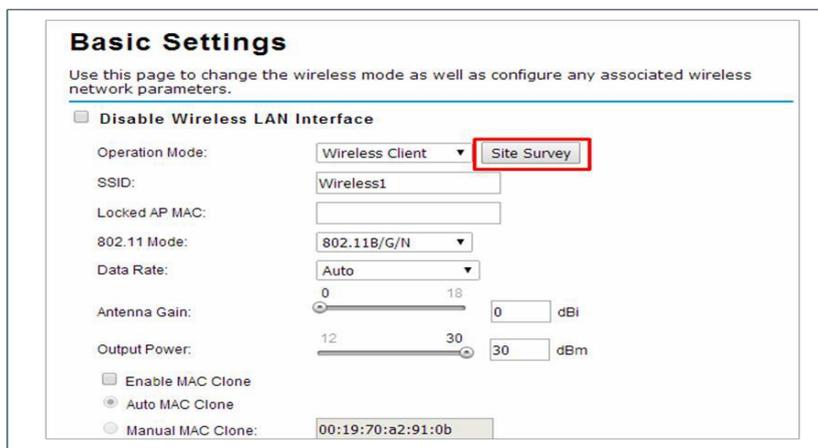
3. The wireless client will then scan all the available access points within the coverage area. Make your selection, then click **Select AP** to establish the connection.

4. If the AP you connected to requires authentication or encryption, click **Profile Settings** in the left column. Select the corresponding authentication and encryption options, and click "**Apply**" to save.

5. To check if the association with the Access Point has been successfully made, go to **Status > Connections**. If the connection is established, it will display association information of the Access Point: MAC address, wireless mode, signal strength, and connection time.

Bridge Mode

1. Go to **Wireless > Basic Settings**. Choose "Bridge" from Wireless Mode and choose a clear channel. Next, enter the gain of the external antennas. Click Apply to save the configuration.

2. Go to "**WDS Settings**" in "**Wireless**", input the MAC address of the remote bridge in to the "**Remote AP MAC Address 1**" field and click "**Apply**".

Note:

Bridge uses the WDS protocol that is not defined as the standard thus compatibility issues between equipment from different vendors may arise. Moreover, Tree or Star shape network topology should be used in all WDS uses-cases (i.e. if AP2 and AP3 are specified as the WDS peers of AP1, AP2 should not be specified as the WDS peer of AP3 and AP3 should not be specified as the WDS peer of AP2 in any case). Mesh and Ring network topologies are not supported by WDS and should be avoided in all uses.

3.   Repeat the above procedures to configure the remote ZAC-1023 Bridge.

4.   Enter the actual distance in the **Distance** field. For example, if the distance between the two ZAC-1023 bridges is 3 kilometers, enter "3000" in the field. Click **Apply** to save configuration.

5.   Use ping to verify the link between the two bridges.

6. To check the wireless connectivity, go to **Status > Connections**. If the connection is established, it will display association information of the remote bridge, including the MAC address, wireless mode, signal strength, and connection time.

AP Repeater Mode

Go to **Wireless > Basic Settings**. Choose "AP Repeater" from **Wireless Mode**, and click **Apply** to save.

To establish a point-to-point bridge connection, please follow the procedures described in Bridge mode. To connect the wireless client to the AP, please follow the procedures described in Wireless Client mode.